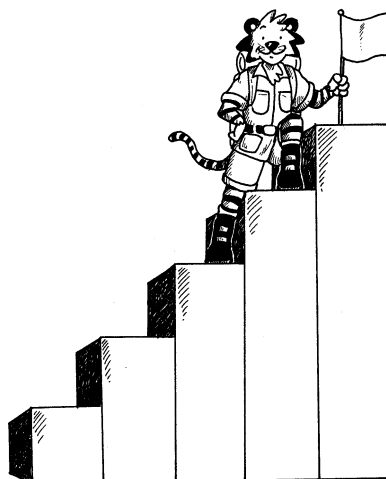


Using Cuisenaire® Rods



Addition & Subtraction

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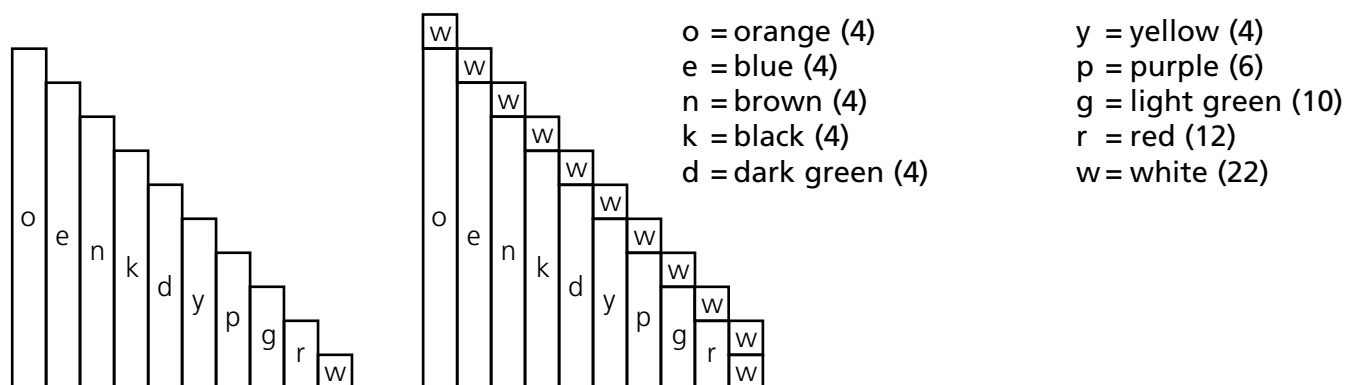
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Lessons

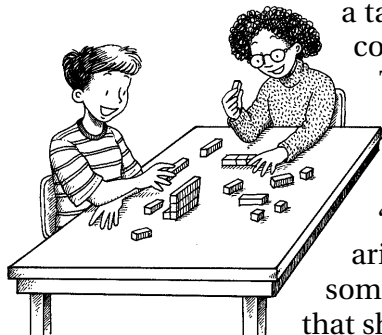
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Exploring with Cuisenaire® Rods

A versatile collection of 10 colored rectangular rods, Cuisenaire® Rods are used to develop a variety of math skills. Each rod's color corresponds to a different length. The shortest rod, white, is 1 centimeter long; the longest, orange, is 10 centimeters long. When the rods are arranged in order of length into a pattern commonly called a "staircase," each rod differs from the next by 1 centimeter. This allows you to assign a value to one rod, then assign values to the other rods based upon the relationships between the rods. One set contains 74 rods, distributed in the quantities shown below. The 10 colors are as follows:



Using letters to represent the rods exposes students to the kind of symbolic thinking they will use later in algebra. With Cuisenaire Rods, students can explore spatial relationships by making flat designs on a table or by stacking them to make three-dimensional designs. They soon discover how some combinations of rods are equal in length to other, single rods. This understanding provides a context for investigating symmetry.



Older students may focus on comparing the lengths of the rods and recording the results on grid paper. This helps them visualize the inherent "structure" of a design and gives them practice in using grade-appropriate arithmetic and geometric vocabulary. Though students need to explore freely, some may appreciate specific challenges, such as being asked to make designs that show fractional equivalence between two groups of rods.

Working with Cuisenaire Rods

Cuisenaire Rods provide a basic model for the numbers 1 to 10. The white rod can stand for 1, and the red rod can stand for 2, because the red rod has the same length as a "train" of two white rods. The rods from light green through orange are assigned values from 3 through 10, respectively. The orange and white rods provide a model for place value. A "train" of 4 orange rods ("tens") and 3 white rods ("ones") is 43 white rods long.

Addition with Cuisenaire Rods

You can model addition for your students by placing rods in trains, and then finding their equivalence. For example, find $4 + 3$ by first making a train with a purple rod (4) and a light green rod (3) and then find the single rod (black) whose length (7) is equal in length to the two-car train made up of purple and light green. This model corresponds to addition on a number line.

p	g
k	

$$4 + 3 = 7$$

Exploring with Cuisenaire® Rods

Use the activities in this book, arranged in order from easiest to most challenging, to further students' understanding of the properties of addition. Start with *All Aboard!* to give students some preliminary practice at recognizing the value of each rod color. In addition, by creating the two-car trains of equivalence, students gain an understanding of which two rods (quantities) are equivalent in value to what other rod (quantity). In this way, you give students an opportunity to review each of the two-addend facts for sums up to 10 and informally expose them to the commutative property of addition.

From there, students progress to more challenging activities, *Logging Company* and *Rod Cover-Up*, in which they must make decisions about which rods to pair in order to reach particular quantities. These activities will strengthen their understanding of the commutative property. *Blue Squares* offers practice in addition facts, while *Special Staircases* extends the learning of math facts up to those with a sum of 20. These four activities give students the added opportunity to strengthen reasoning and game-playing skills. Finally, *Rod Equations* gives students an opportunity for reverse application; instead of attempting to build rods to represent a math fact, students build two equivalent trains and then write all of the math facts represented by the trains. This teaches both the commutative property of addition and the symmetric property of equality.



Subtraction with Cuisenaire Rods

The rods can also be used for acting out subtraction as students search for a missing addend. For example, they can solve $7 - 3$ by placing a light green rod (3) on top of a black rod (7). Students then look for the rod that, when placed next to the light green rod, makes a train equal in length to the black. The missing addend, a purple rod (4), is the solution to this subtraction problem.

Once students have completed the *All Aboard!* activity and have a basic understanding of the values and uses of the rod colors, you can move on to *Logging Company* and *Rod Cover-Up*. Both units offer practice in basic subtraction facts through the use of the rods. To challenge students' understanding of subtraction's inverse relationship to addition, move to *Rod Equations*. This unit gives children practice in looking at the rods and writing the math facts represented by each train.

Where Do We Go from Here?

Cuisenaire Rods are also effective models for investigating more advanced math operations and concepts, including Multiplication and Division, Fractions and Decimals, Geometry, Measurement, Number Patterns, and Logical Reasoning. Contact Learning Resources, Inc. for a complete line of mathematics teaching tools, including numerous manipulative kits, Cuisenaire products, and these other titles in the *Using Cuisenaire Rods* series:

- LER 7528 Using Cuisenaire® Rods: Multiplication & Division
- LER 7529 Using Cuisenaire® Rods: Fractions & Decimals
- LER 7530 Using Cuisenaire® Rods: Geometry & Measurement

Cuisenaire Rods and the NCTM Standards



The activities in *Using Cuisenaire Rods: Addition & Subtraction* are consistent with the vision of mathematics teaching described in the *Principles and Standards for School Mathematics* published by the National Council of Teachers of Mathematics. All of these activities involve the use of the Process Standards: Problem Solving, Reasoning and Proof, Communication, Connections, and Representation. Each activity also focuses on one or more of the following Content Standards: Number and Operations, Algebra, Geometry, Measurement, or Data Analysis and Probability.

Name: _____

Logging Company

Numbers • Probability • Statistics

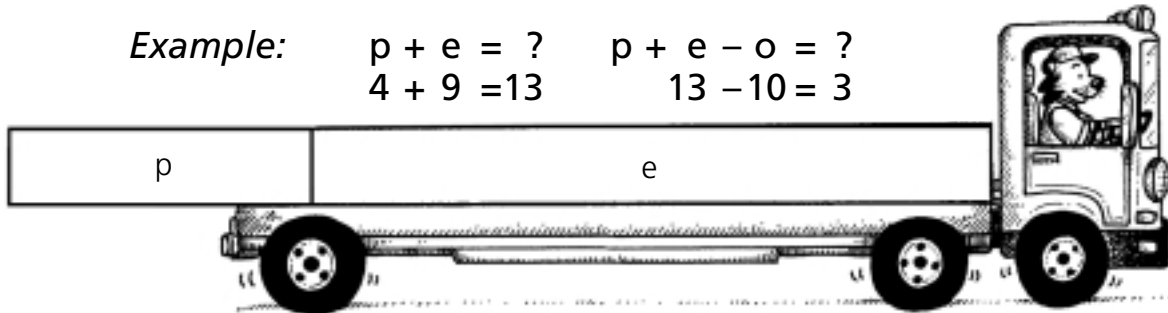
Addition • Subtraction • Chance • Game Strategies

Overloaded Trucks

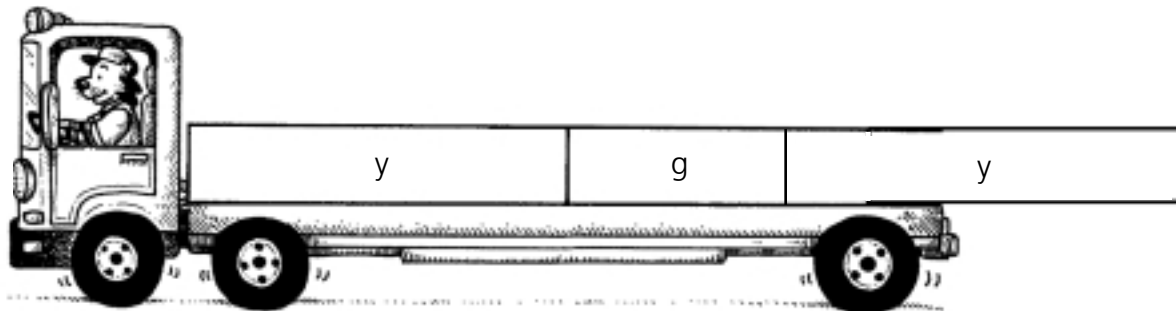
Each of the trucks below is carrying rods equal to more than 10 white rods. Determine the "weight" of each truck's load by writing an addition sentence that corresponds to the values of the rods in that truck. Then, find how many rods you'd need to subtract to make the load equal to 10 white rods. Show your work.

1.

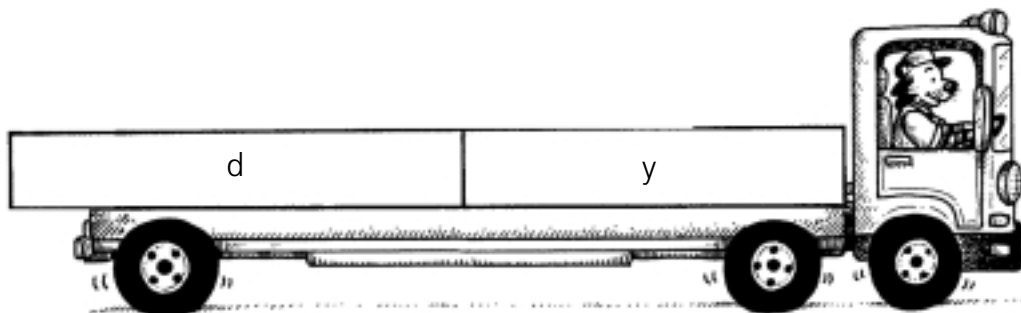
Example: $p + e = ?$ $p + e - o = ?$
 $4 + 9 = 13$ $13 - 10 = 3$



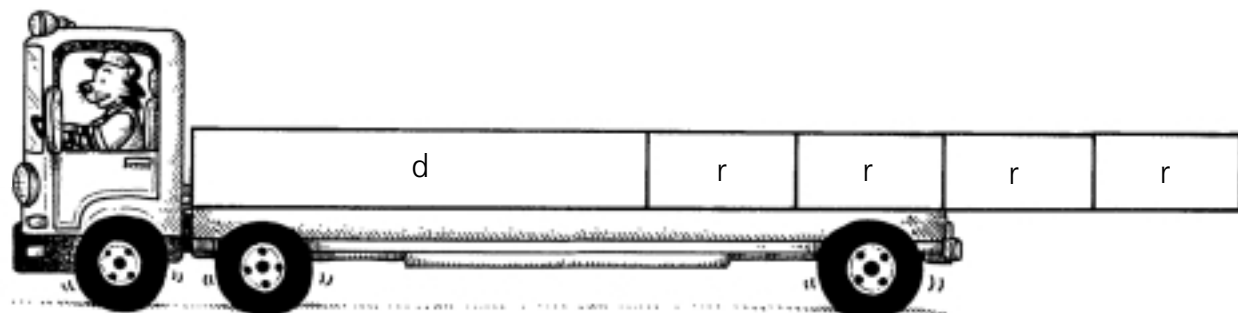
2.



3.



4.



Using Cuisenaire® Rods

Addition & Subtraction, Grades 1-3

LER 7527

Discover hundreds of classroom applications for the most versatile hands-on math tool! This expansive series provides step-by-step teaching strategies and all the reproducible resources you'll need to present major math concepts to students in Grades 1 through 6. Developed by educators to conform to the NCTM's latest content strands and topics, each 48-page book's six field-tested, comprehensive units include:

- Complete lesson plans
- In-depth hands-on activities
- Blackline masters
- Assessment worksheets
- Math extensions
- Detailed teaching notes

Look for the other fine Cuisenaire® Rods products available from Learning Resources®:

LER 7528 - Using Cuisenaire® Rods: Multiplication & Division, Grades 2-4
LER 7529 - Using Cuisenaire® Rods: Fractions & Decimals, Grades 3-6
LER 7530 - Using Cuisenaire® Rods: Geometry & Measurement, Grades 3-6
LER 7500 - Cuisenaire® Rods Introductory Set (Plastic)
LER 7501 - Cuisenaire® Rods Introductory Set (Wood)
LER 7504 - Cuisenaire® Rods Activity Set Gr. PreK-2 (Plastic)
LER 7505 - Cuisenaire® Rods Activity Set Gr. PreK-2 (Wood)
LER 7508 - Overhead Cuisenaire® Rods

